RUTGERS
New Jersey Agricultural Experiment Station

NEW JERSEY ADULT MOSQUITO SURVEILLANCE

Report for 20 June to 26 June 2010, CDC Week 25

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Center for Vector Biology

This New Jersey Agricultural Experiment Station report is supported by Rutgers University, Hatch funds, funding from the NJ State Mosquito Control Commission and with the participation of the 21 county mosquito control agencies of New Jersey.

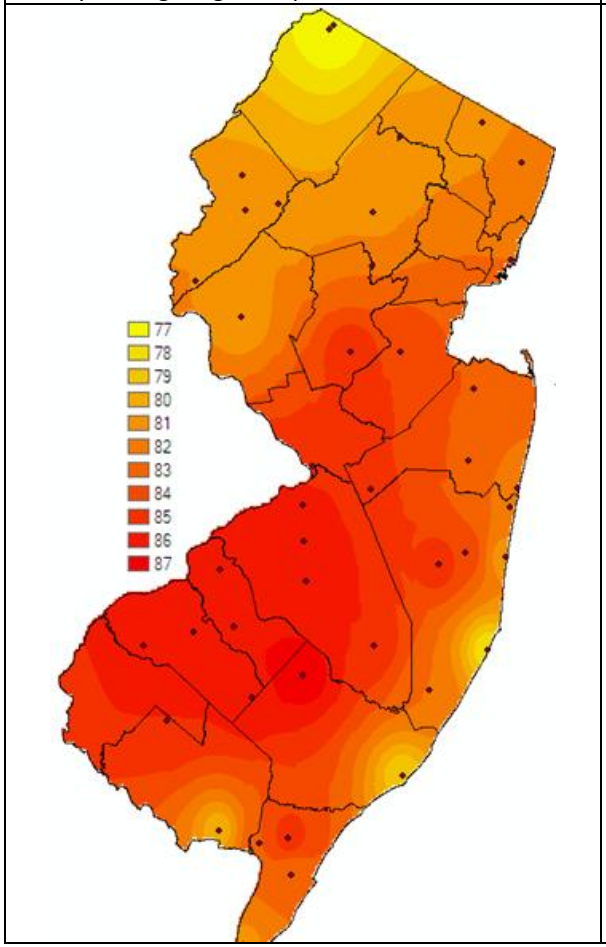
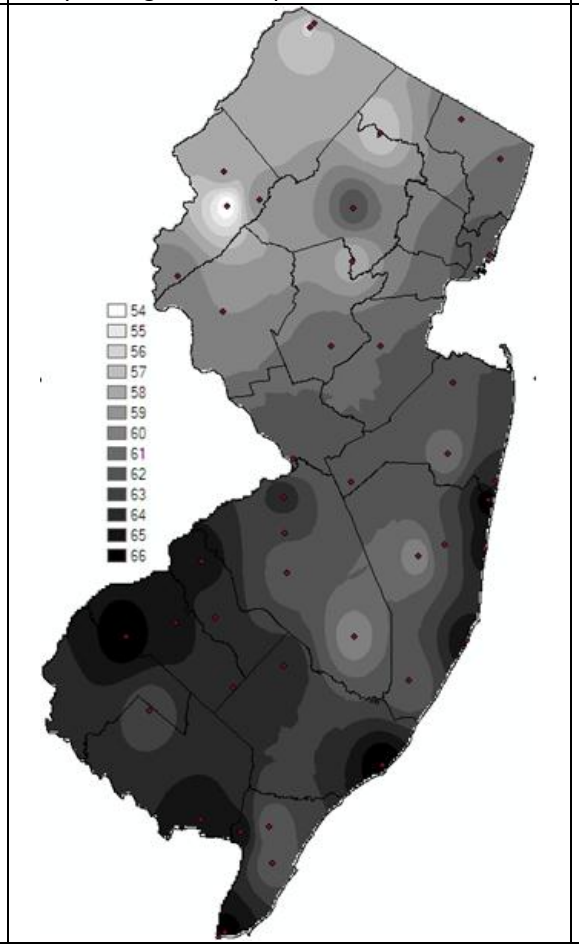
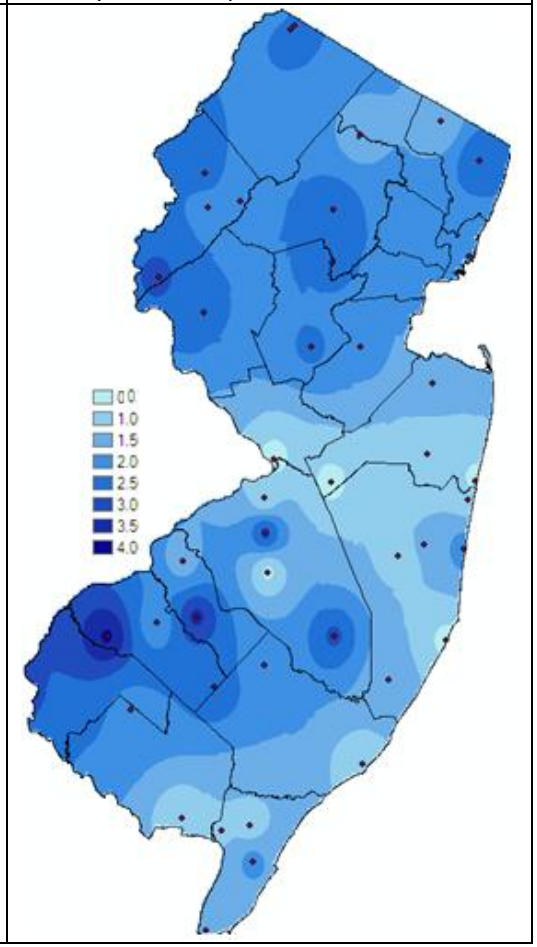
Summary table – Week 25

	Aedes vexans			*Culex* Mix			*Coquillettidia perturbans*			*Aedes sollicitans*		
Region	This Week	Average*	Increase	This Week	Average*	Increase	This Week	Average*	Increase	This Week	Average*	Increase
Agricultural	**0.14**	**2.48**	**0**	**1.02**	**3.17**	**0**	**0.93**	**0.44**	**3**	**0.00**	**0.09**	**0**
Coastal	**0.29**	**10.33**	**0**	**0.56**	**14.42**	**0**	**0.46**	**2.49**	**0**	**2.06**	**4.92**	**0**
Delaware Bayshore	**0.17**	**5.14**	**0**	**1.43**	**17.31**	**0**	**3.29**	**3.05**	**1**	**1.23**	**8.71**	**0**
Delaware River Basin	**0.00**	**7.32**	**0**	**0.04**	**5.21**	**0**	**0.00**	**0.39**	**0**	**0.00**	**0.04**	**0**
New York Metro	**0.47**	**6.32**	**0**	**4.20**	**10.91**	**0**	**0.44**	**0.60**	**0**	**0.10**	**0.45**	**0**
North Central Rural	**0.18**	**0.31**	**0**	**0.35**	**1.30**	**0**	**0.12**	**0.00**	**4**	**0.00**	**0.00**	**0**
Northwest Rural	**0.23**	**10.69**	**0**	**0.17**	**4.14**	**0**	**5.10**	**0.57**	**4**	**0.00**	**0.00**	**0**
Philadelphia Metro	**0.60**	**12.49**	**0**	**1.10**	**9.28**	**0**	**0.34**	**1.81**	**0**	**0.00**	**0.00**	**0**
Pinelands	**0.04**	**2.27**	**0**	**0.30**	**3.40**	**0**	**0.96**	**1.05**	**0**	**0.00**	**0.12**	**0**
Suburban Corridor	**0.47**	**3.37**	**0**	**2.82**	**3.23**	**0**	**0.60**	**0.74**	**0**	**0.03**	**0.02**	**2**

*Averages represent data from, at most, the previous 5 years. Increase is a scale of current values from historical values where no difference or a decrease is represented by 0 (blue), up to 50% greater difference by 1 (green), up to 100% greater difference by 2 (yellow), up to 150% greater difference by 3 (orange) and greater than 150% increase by 4 (red). White cells in the increase column denote increases from an historic zero and thus no value can be appropriately given.

State Summary: *Coquillettidia perturbans* abundances continue to be elevated in several regions, particularly in the North Central Rural and Northwestern Rural regions. *Ae. sollicitans*, despite overall low numbers throughout the state, are showing up in the Suburban Corridor with slightly elevated numbers.

Climate Factors

May Average High Temperatures 1 Jun to 30 Jun	May Average Low Temperatures 1 Jun to 30 Jun	May Total Precipitation 1 Jun to 30 Jun
		

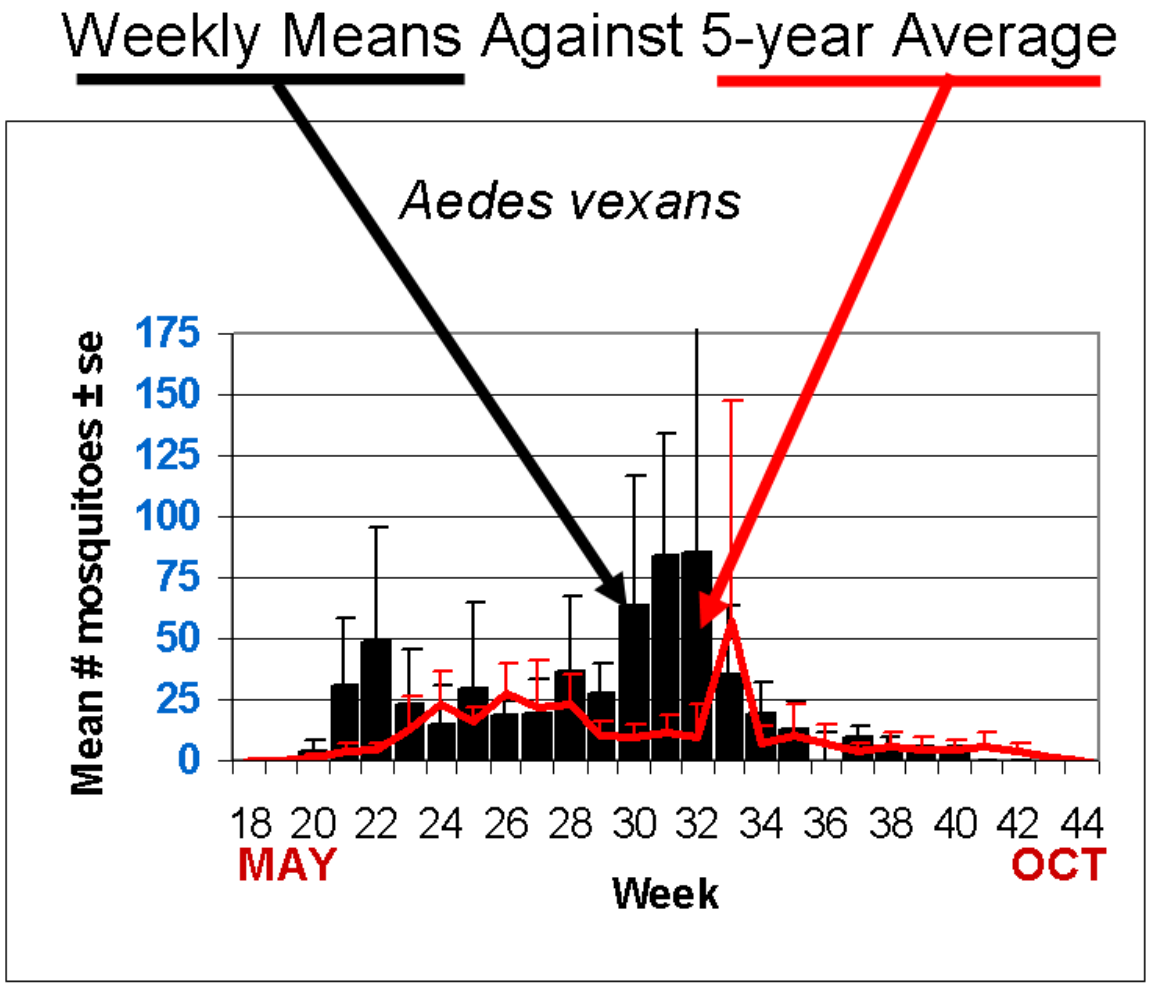
The three figures show the interpolation of average maximum and minimum temperature and total precipitation from June 1 to June 30, 2010 in New Jersey. Data points are from 35 weather stations maintained through the New Jersey Weather & Climate Network and the State Climatologist. Interpolation between points was performed using ArcMap 9.2.

The past week, regions gained about 2 degrees from the previous week. Average high temperatures continued to be highest in the interior portions of New Jersey and coolest along the coastal and northwestern regions. Average low temperatures were lowest in the northern portion of the state with pockets of cooler areas in the Pinelands. Highest rainfall was in the Delaware River Basin with most regions gaining less than one inch from the previous week.

NJ Weather & Climate NETWORK

ONJSC at Rutgers University

The Species Graphs: The species graph pages include a graph with two plots for each of the ten regions defined on the first page (Agricultural, Coastal, Delaware Bayshore, Delaware River, New York Metro, North-Central, Northwestern, Philadelphia Metro, Pinelands, and Suburban Corridor). Below is an example of one graph from one species within one region. The bar plot show the average number of mosquitoes per trap within the region (weekly means) and line plots show the historical trend as the average number of mosquitoes from the previous 5 years (5-year average). In general, historical data are running means from the previous 5 years, but on occasion, will include data from fewer years. Adjustments are made to account for year discrepancies. Data for this week are from Atlantic, Bergen, Camden, Cape May, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Ocean, Salem, Sussex, Union and Warren counties. Note: Previous week's data are from Atlantic, Bergen, Burlington, Camden, Cape May, Cumberland, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Ocean, Salem, Somerset, Sussex, Union and Warren counties.



Aedes vexans - Fresh Floodwater Species
Multivoltine Aedine (*Ae. vexans* Type)

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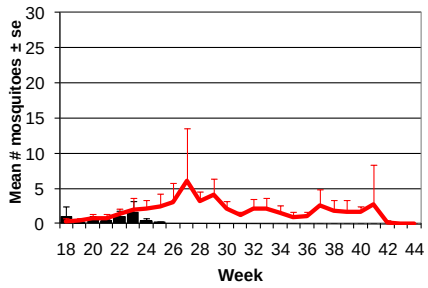
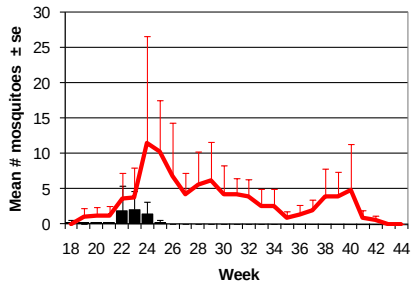
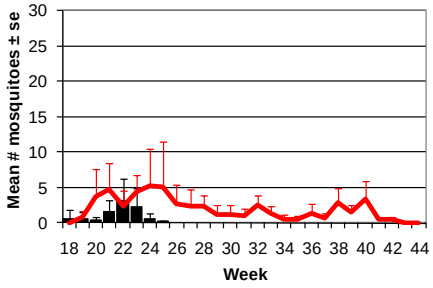
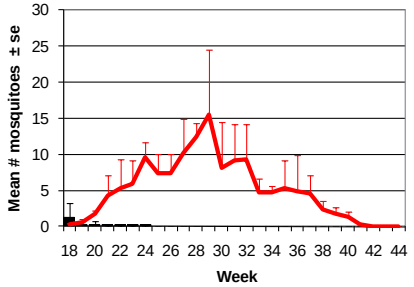
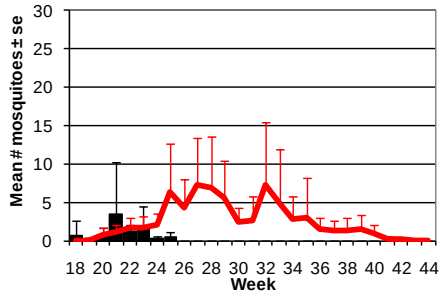
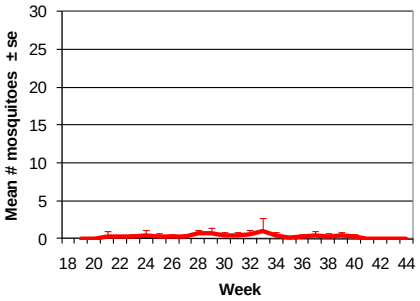
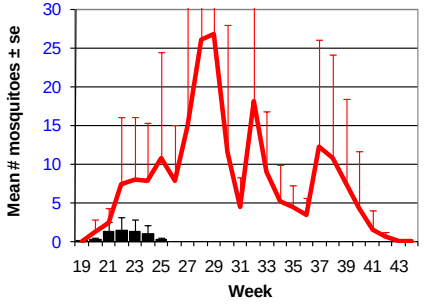
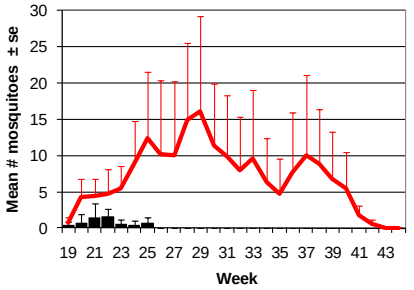
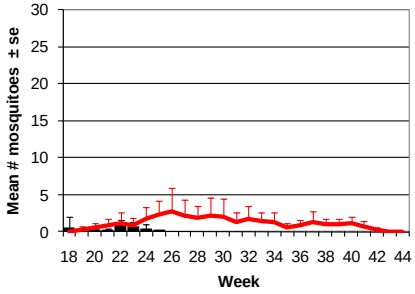
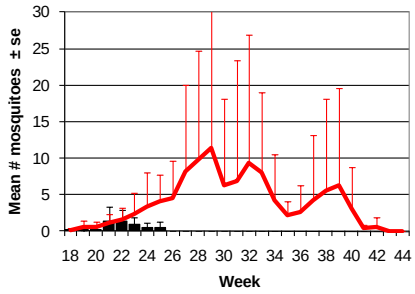
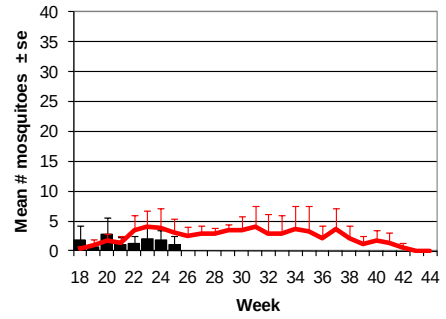
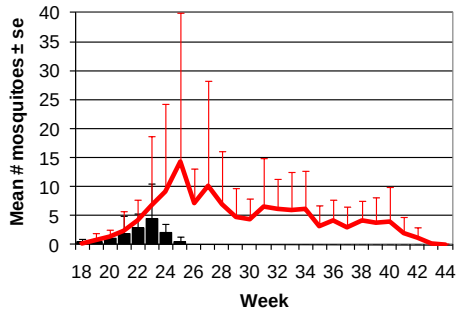
			
New York Metro	**North Central Rural**	**Northwestern Rural**	**Philadelphia Metro**
			
Pinelands	**Suburban Corridor**	**Comments**	
		*Aedes vexans* low abundances continue to reflect low amounts of precipitation through most of the state. Rainfall amounts were highest in the Delaware River Basin and southern parts of the Agricultural regions, but were local and not reflected in the traps used for this program. Although New Jersey has experienced normal or above normal rainfall over the past year, rainfall for the last 90 days has been between normal to 50% below normal. See data at http://www.njdrought.org/rainfall.html	

Culex Mix – Permanent Water Species
Multivoltine *Culex*/*Anopheles* (*Cx. pipiens* Type)

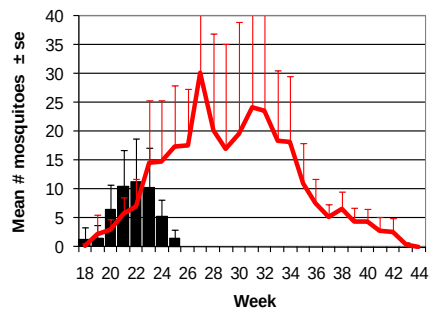
Agricultural



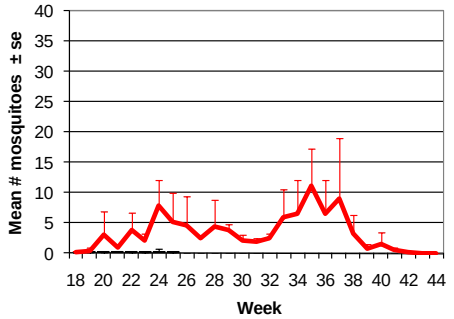
Coastal



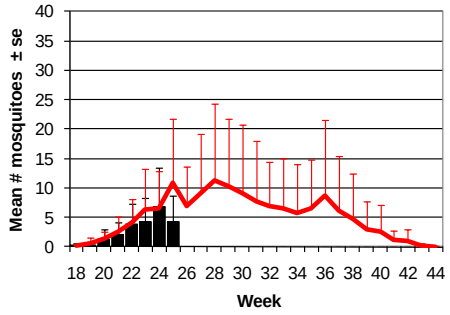
Delaware Bayshore



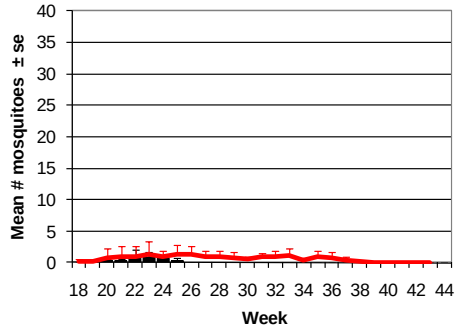
Delaware River Basin



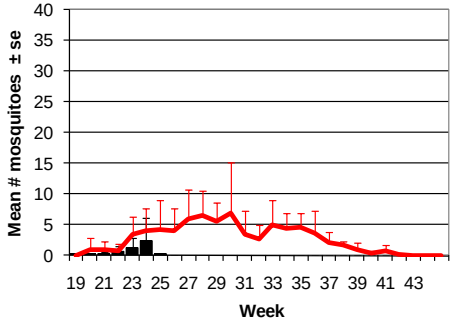
New York Metro



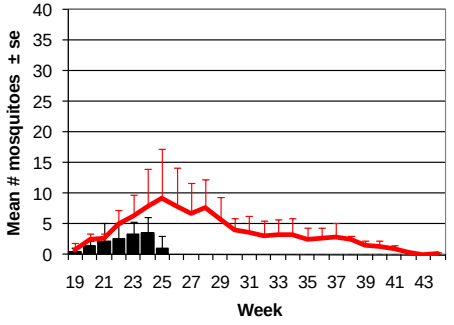
North Central Rural



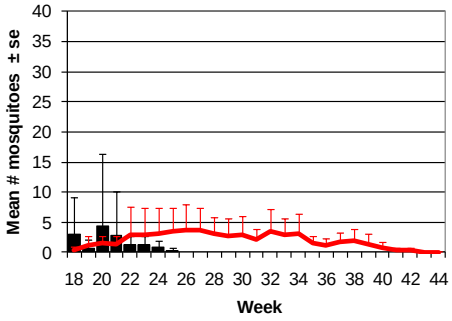
Northwestern Rural



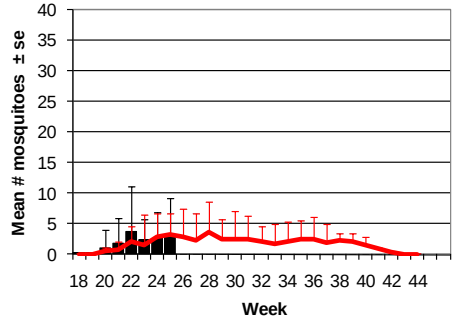
Philadelphia Metro



Pinelands



Suburban Corridor

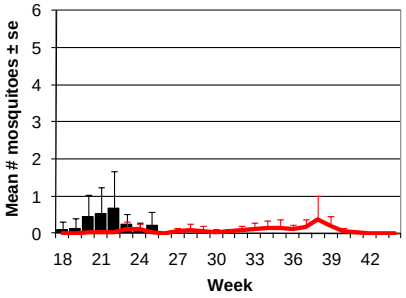
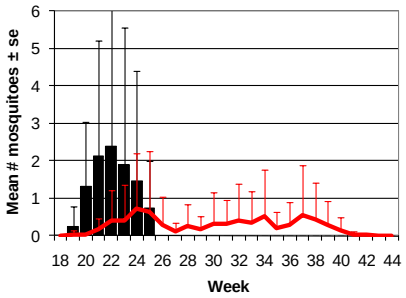
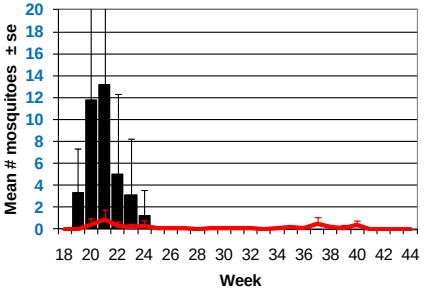
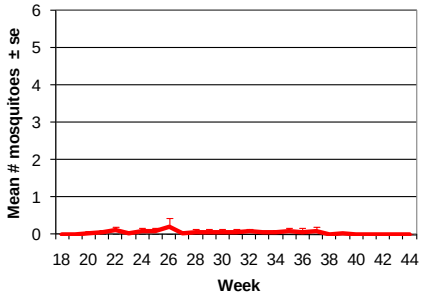
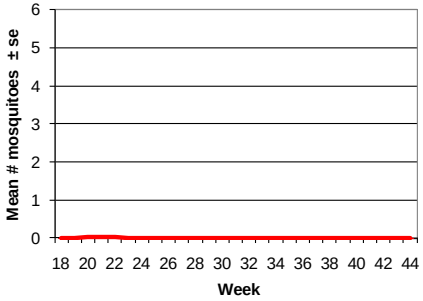
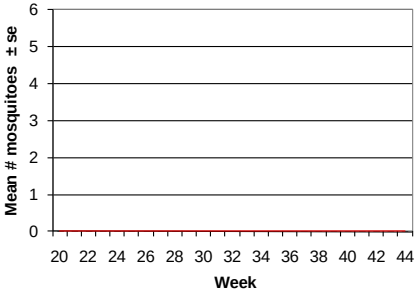
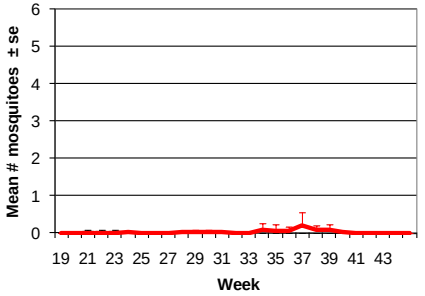
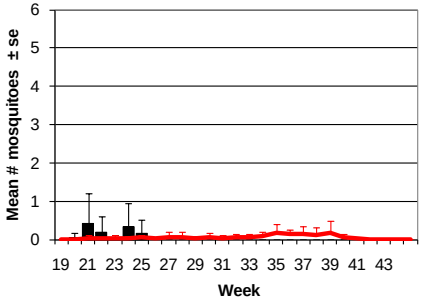
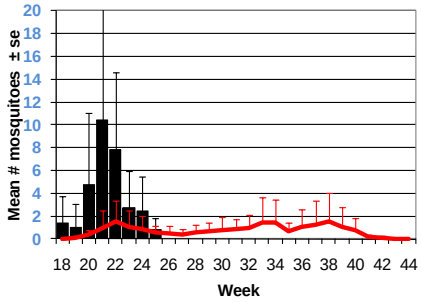
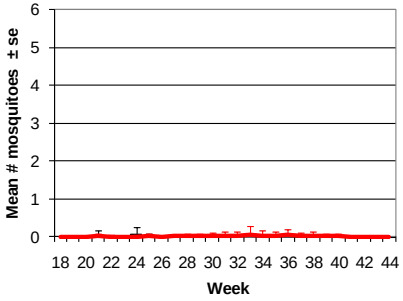


Comments

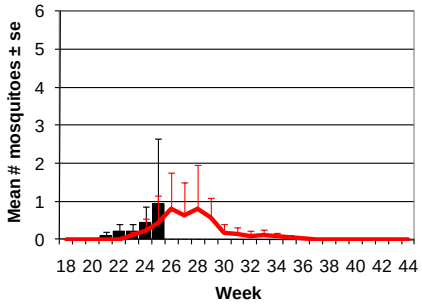
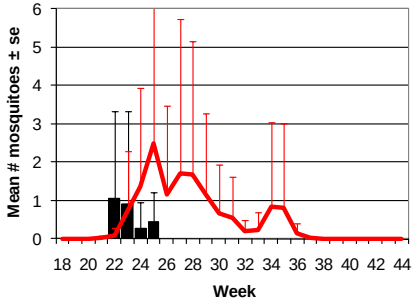
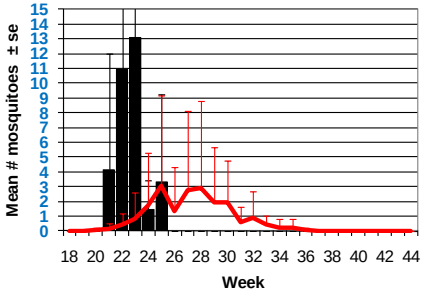
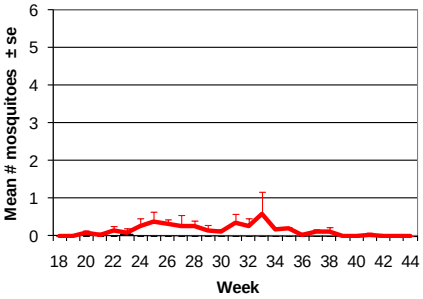
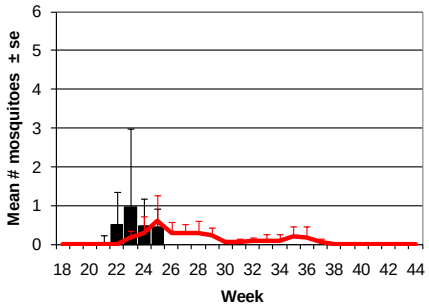
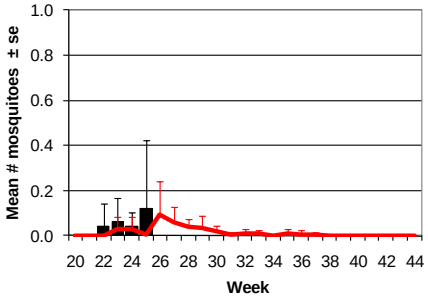
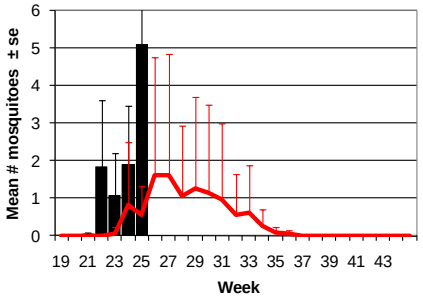
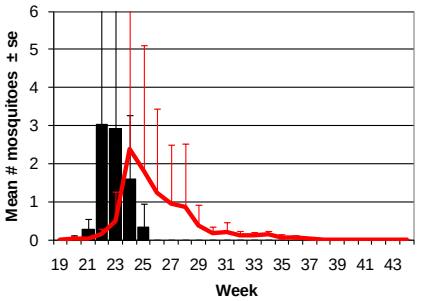
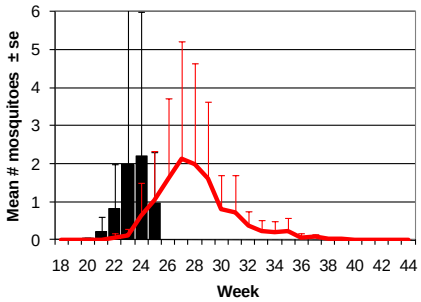
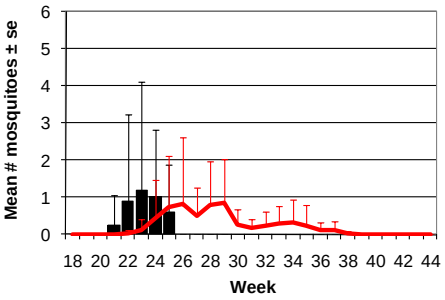
Culex Mix is represented by three species of *Culex* mosquitoes: *Cx. pipiens, Cx. restuans* and *Cx. salinarius*. These mosquitoes are usually grouped together as there is considerable difficulty in separating them to species easily after travelling through the grind of the light trap, often in the company of protesting moths and beetles.

Permanent water species such as *Culex* are showing less of a population deficit than floodwater species. However, as water becomes less available for other organisms, host and vectors may find themselves concentrated in areas where water is available. This was one explanation given which also found a correlation with WNV activity and low *Aedes* numbers (see previous page) in July (Ginsberg et al 2010 The use of early summer mosquito surveillance to predict late summer West Nile virus activity, J Vector Ecology, 35 (1): 35-42. 2010.).

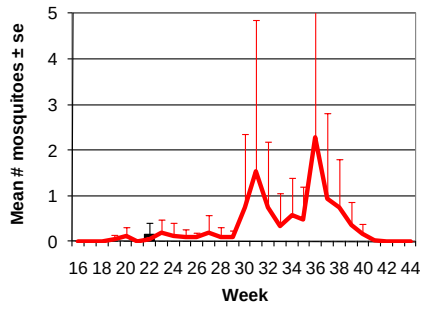
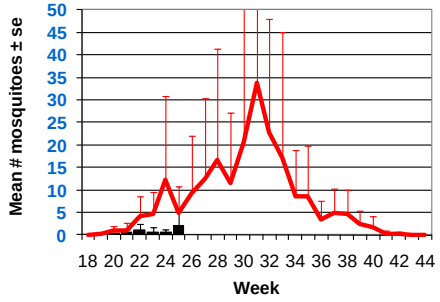
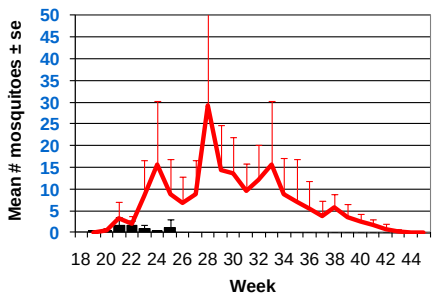
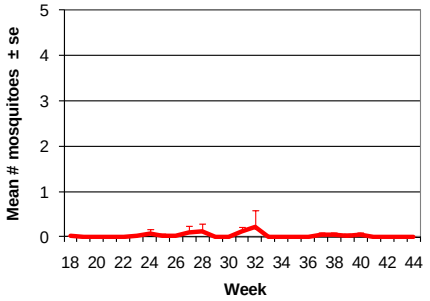
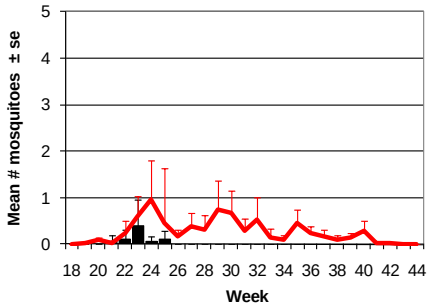
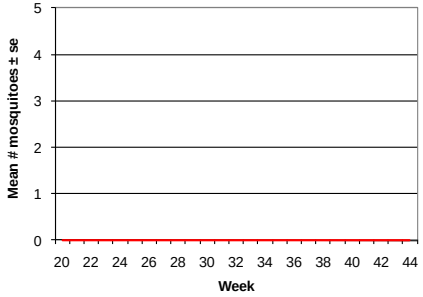
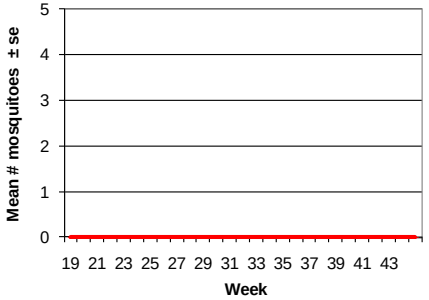
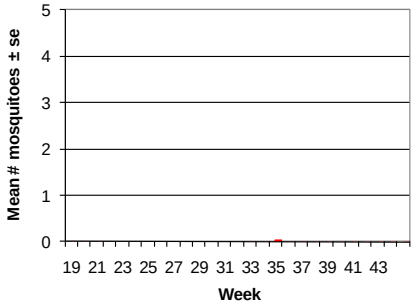
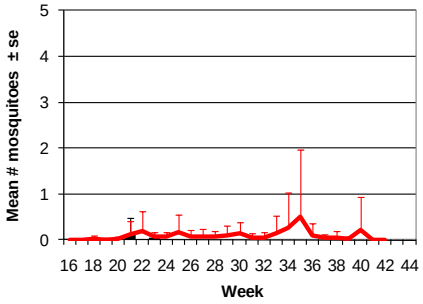
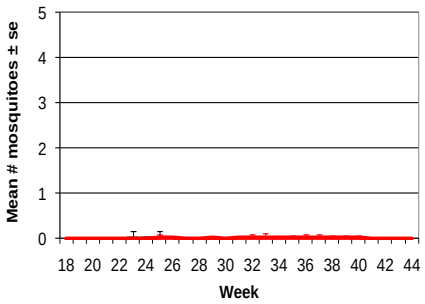
Culiseta melanura – Miscellaneous Group Unique (*Cs. melanura* Type)

Agricultural	Coastal	Delaware Bayshore	Delaware River Basin
			
New York Metro	**North Central Rural**	**Northwestern Rural**	**Philadelphia Metro**
			
Pinelands	**Suburban Corridor**	**Comments**	
		*Culiseta melanura*, the enzootic ornithophilic vector of eastern equine encephalitis, have been decreasing in most regions to the point of historical levels after showing significantly high abundances in the Coastal, Delaware Bayshore and Pinelands regions. Currently, the Vector Surveillance program has not detected the presence of EEE in New Jersey populations, but given last years' high activity and the current population levels, positive pools of both enzootic and bridge vectors are anticipated.	

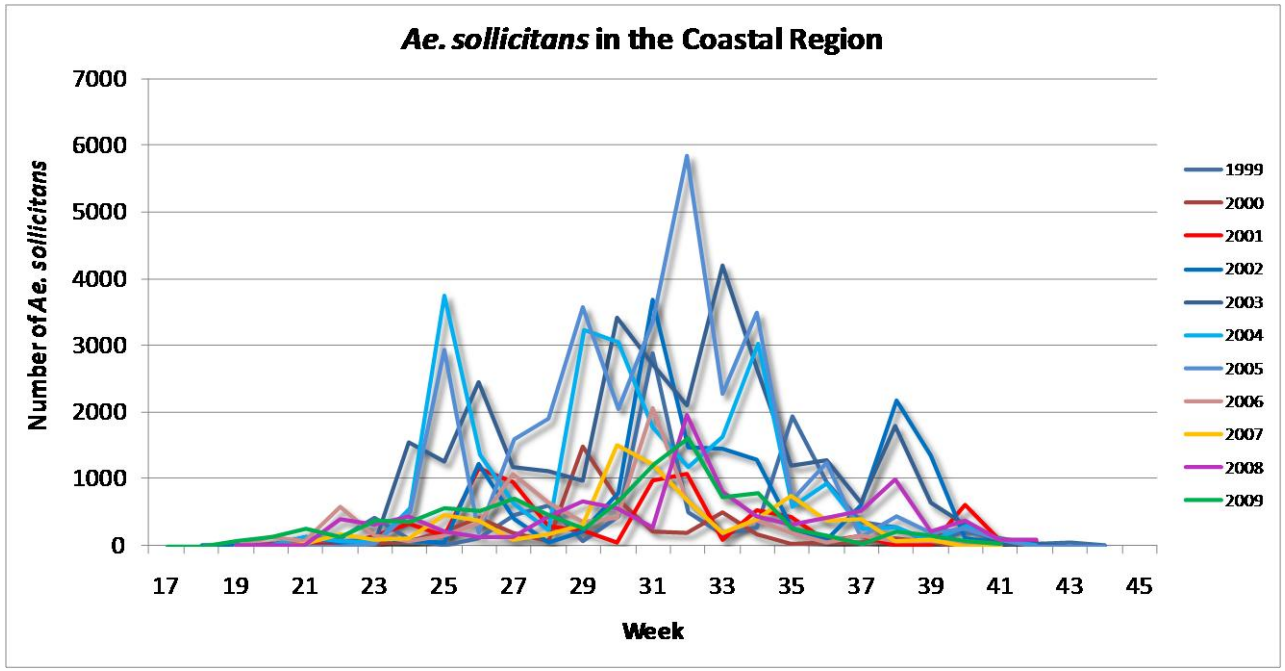
Coquillettidia perturbans – Miscellaneous Group
Monotypic (*Coq. perturbans* Type)

Agricultural	Coastal	Delaware Bayshore	Delaware River Basin
			
New York Metro	**North Central Rural**	**Northwestern Rural**	**Philadelphia Metro**
			
Pinelands	**Suburban Corridor**	**Comments**	
		Populations of *Coquillettidia perturbans* appear to be decreasing in some regions, such as the Coastal and Delaware Bayshore while for other populations (Northwestern Rural), that trend is less apparent. This permanent water species has been implicated through numerous articles as a potential bridge vector to inland cases of EEE and thus the patterns of seasonal abundances may be important in the transmission of disease. Also noteworthy is the effect of the EEE virus on the fitness of this species (Moncayo, et al 2000 Effect of Eastern Equine Encephalomyelitis Virus on the Survival of Aedes albopictus, Anopheles quadrimaculatus, and Coquillettidia perturbans (Diptera: Culicidae) J. Med. Ent. 37(5): 701-706) resulting in a reduction of survivability and daughters. The authors noted that this did not mean that this species could be ruled out as a potential bridge vector given that it took time (7 days) for these effects to be observed.	

Aedes sollicitans - Salt Floodwater Species
Multivoltine Aedine (*Ae. sollicitans* Type)

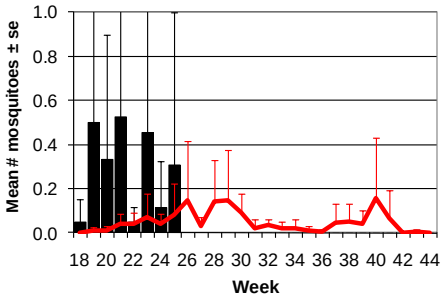
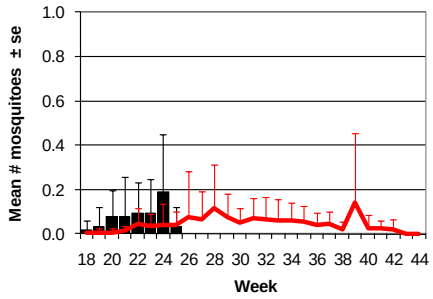
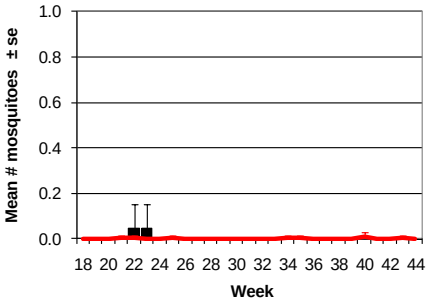
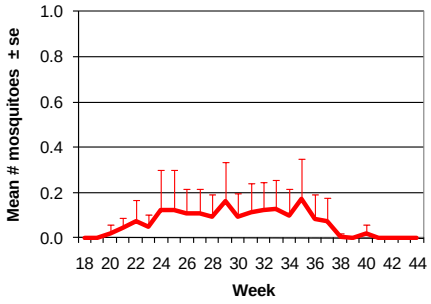
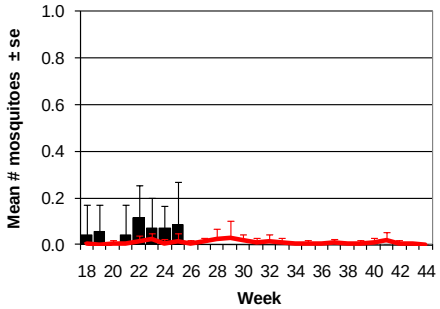
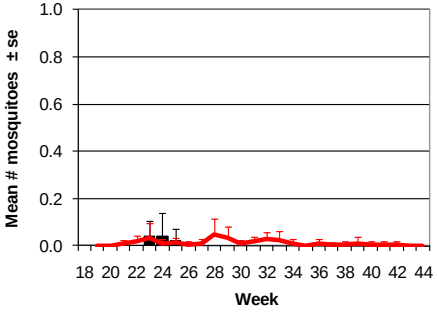
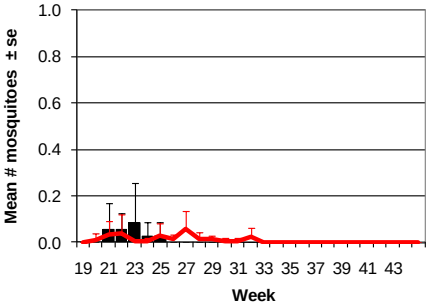
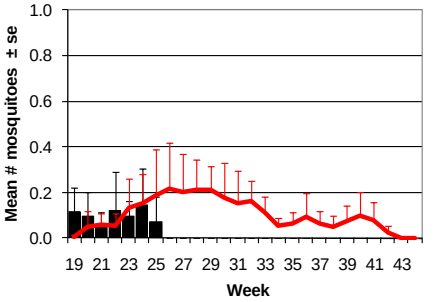
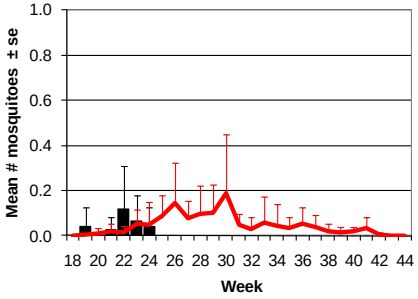
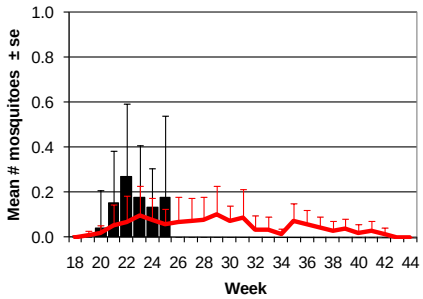
Agricultural	Coastal	Delaware Bayshore	Delaware River Basin
			
New York Metro	**North Central Rural**	**Northwestern Rural**	**Philadelphia Metro**
			
Pinelands	**Suburban Corridor**	**Comments**	
		*Aedes sollicitans* population numbers continue to be low at the two regions of highest production, the Coastal and the Delaware Bayshore. The next emergence is appearing in the Coastal, Delaware Bayshore and New York Metro regions. Please see next page.	

Recent History of *Aedes sollicitans* in the Coastal Region



Aedes sollicitans populations have varied over the past decade with highest abundances coming from 1999 and 2002 through 2005. From 2006 through last year, abundances have been lower than the previous 4 years. This cycling may be related to several factors including natural population cycling, pesticide changes and marsh management. Influences of meteorological data on *Ae. sollicitans* populations have been successfully modeled by a poisson regression or log-linear model using varying lagged variables such as minimum tide, precipitation and minimum humidity (Shone et al 2006 Characterizing Population Dynamics of Aedes sollicitans (Diptera: Culicidae) Using Meteorological Data, J. Med. Ent. 43(2): 393-402). Changes also occurred in the type of pesticide applied (from Methoprene to *Bti*) beginning in 2005 and 2006 and from Temephos to *Bti* in 2009 for different counties. In addition, marsh management operations have increased in some areas that should reduce *Ae. sollicitans* populations.

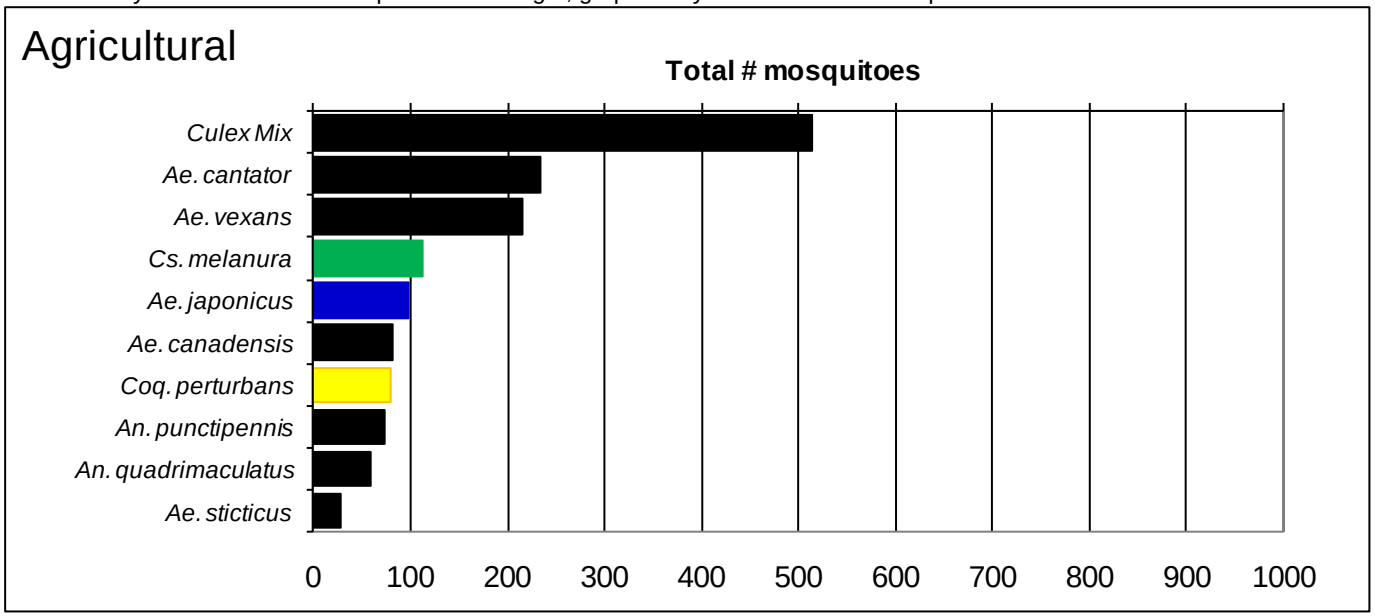
Aedes japonicus – Container Species
Multivoltine Aedine (*Ae. triseriatus* Type)

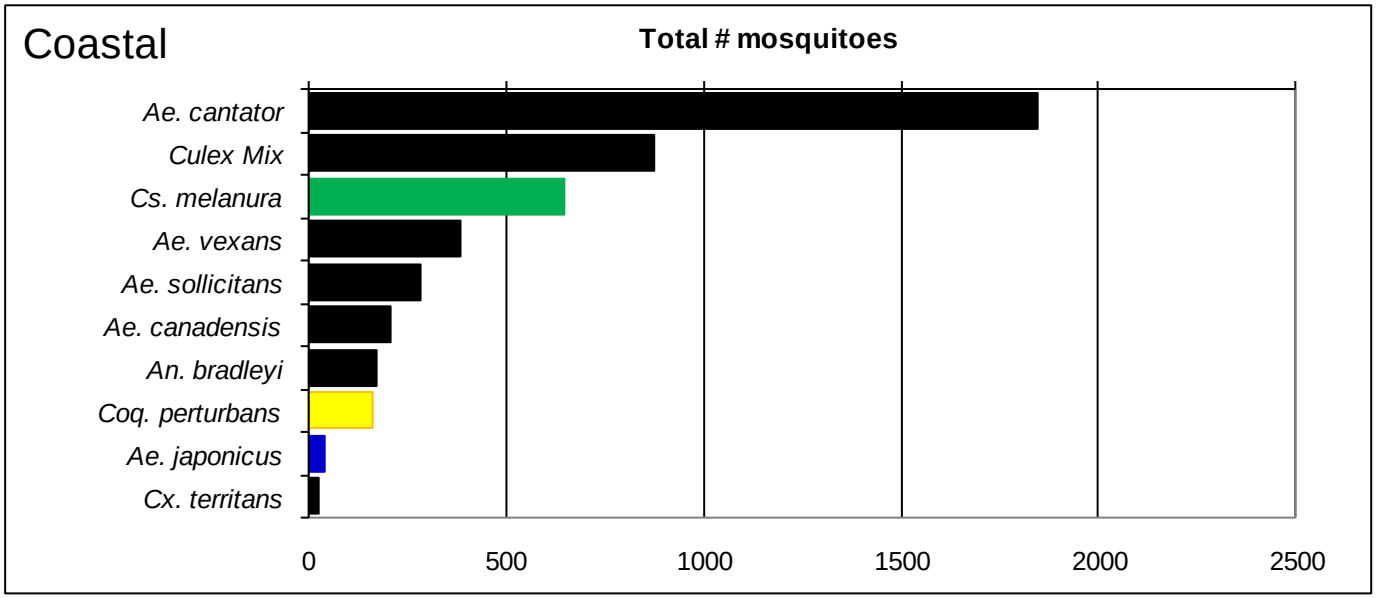
Agricultural	Coastal	Delaware Bayshore	Delaware River Basin
			
New York Metro	**North Central Rural**	**Northwestern Rural**	**Philadelphia Metro**
			
Pinelands	**Suburban Corridor**	**Comments**	
		*Aedes japonicus*, a hardy cold-tolerant species, is higher in the Agricultural, New York Metro and the Suburban Corridor for some of the traps involved in those regions (but not all, given the large error bars).	

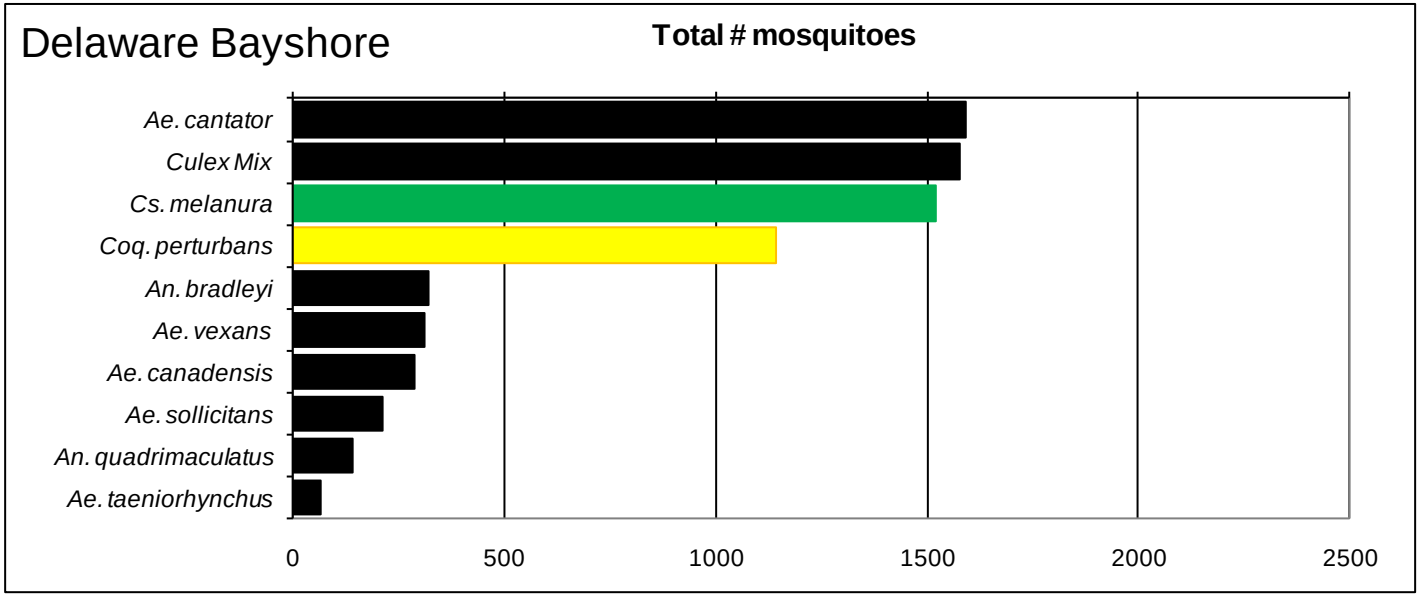
WNV *EEE*

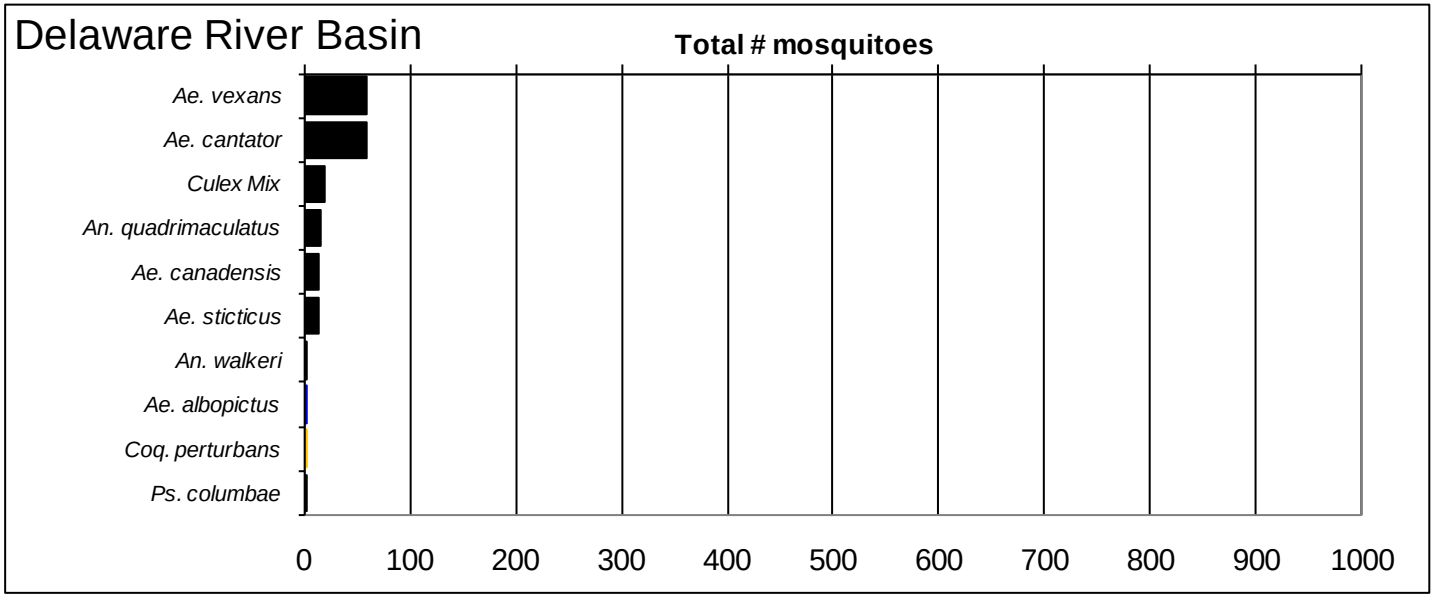
Top Ten Cumulative Mosquito Species/Region - *Ae. albopictus,* *Ae. japonicus (invasives);* *Cs. melanura or Cx. erraticus* *Coq. perturbans*

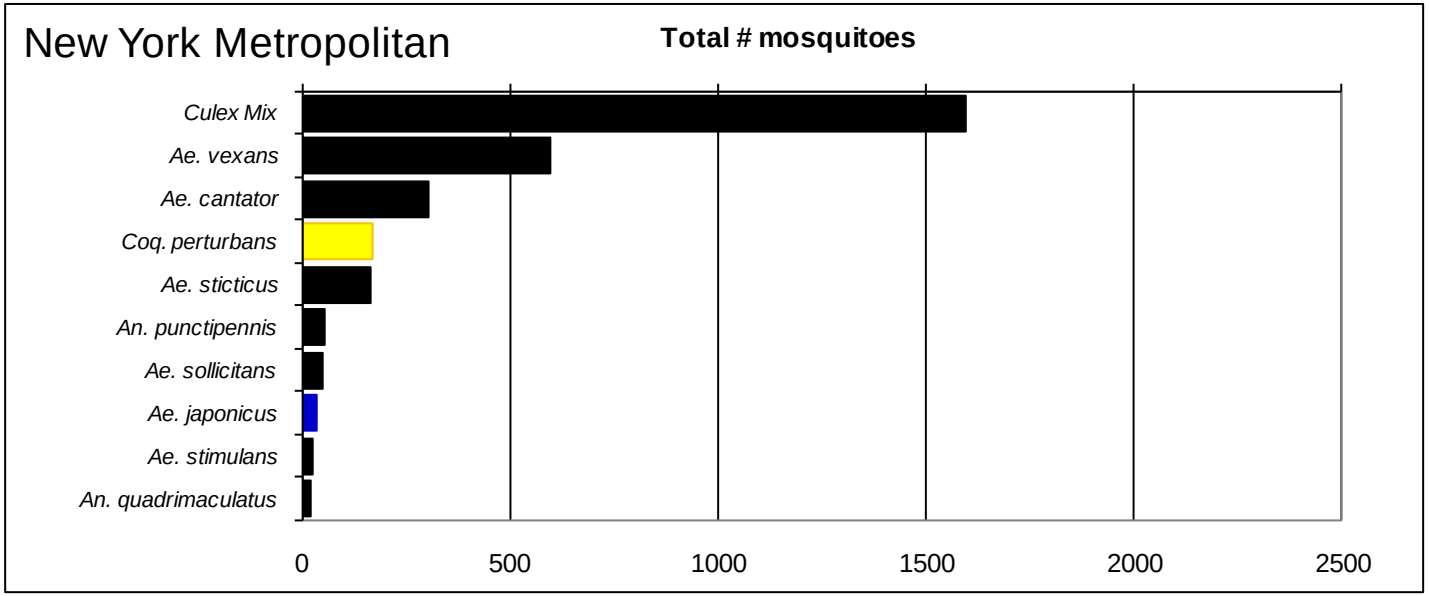
Note: In early season when fewer species are caught, graphs may show less than ten species listed.

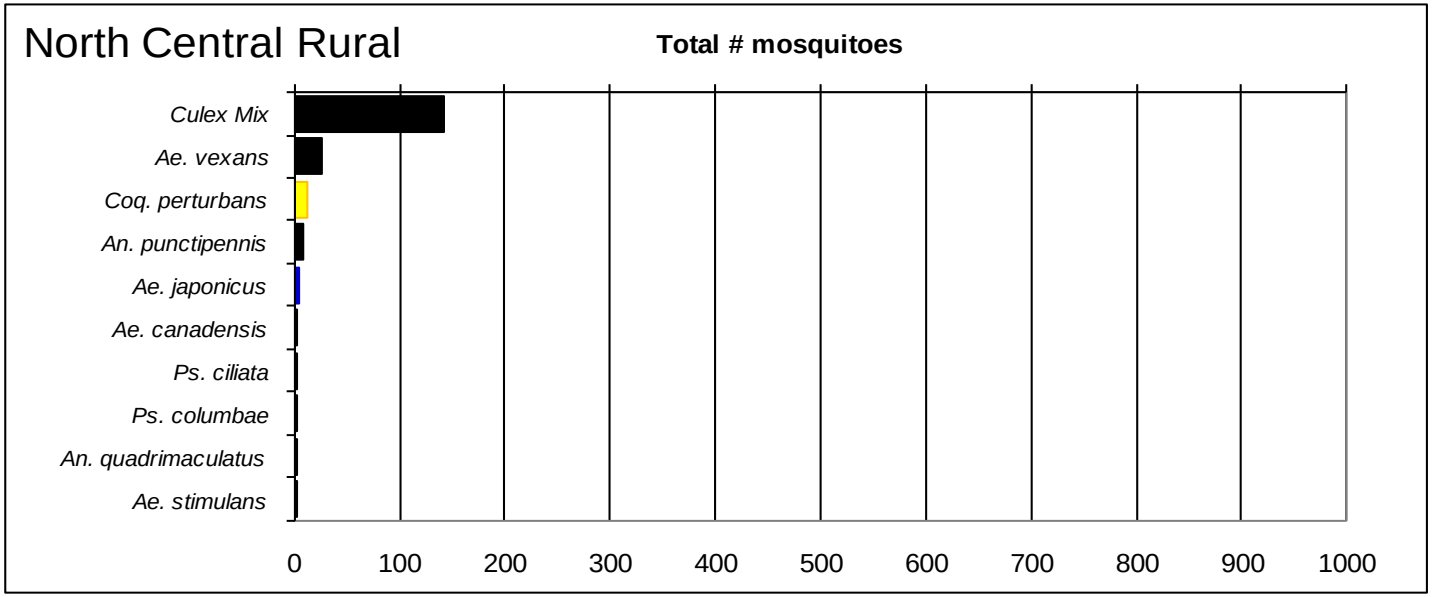


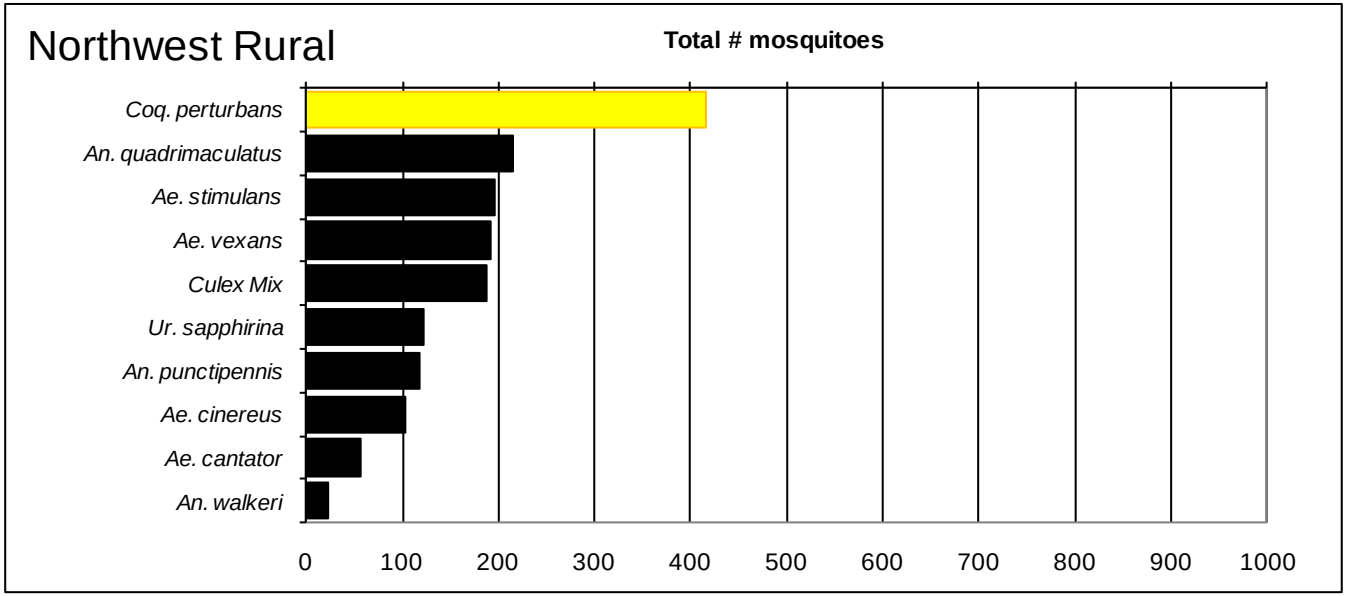


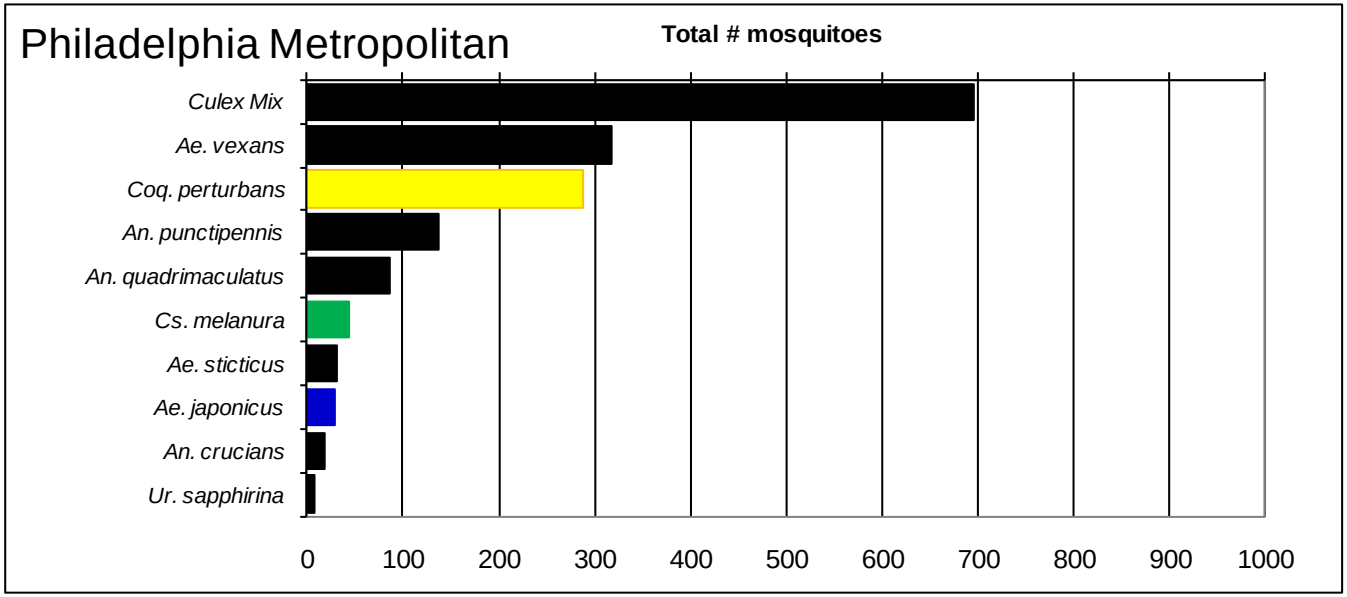

Delaware Bayshore
Total # mosquitoes
Ae. cantator
Culex Mix
Cs. melanura
Coq. perturbans
An. bradleyi
Ae. vexans
Ae. canadensis
Ae. sollicitans
An. quadrimaculatus
Ae. taeniorhynchus
0
500
1000
1500
2000
2500

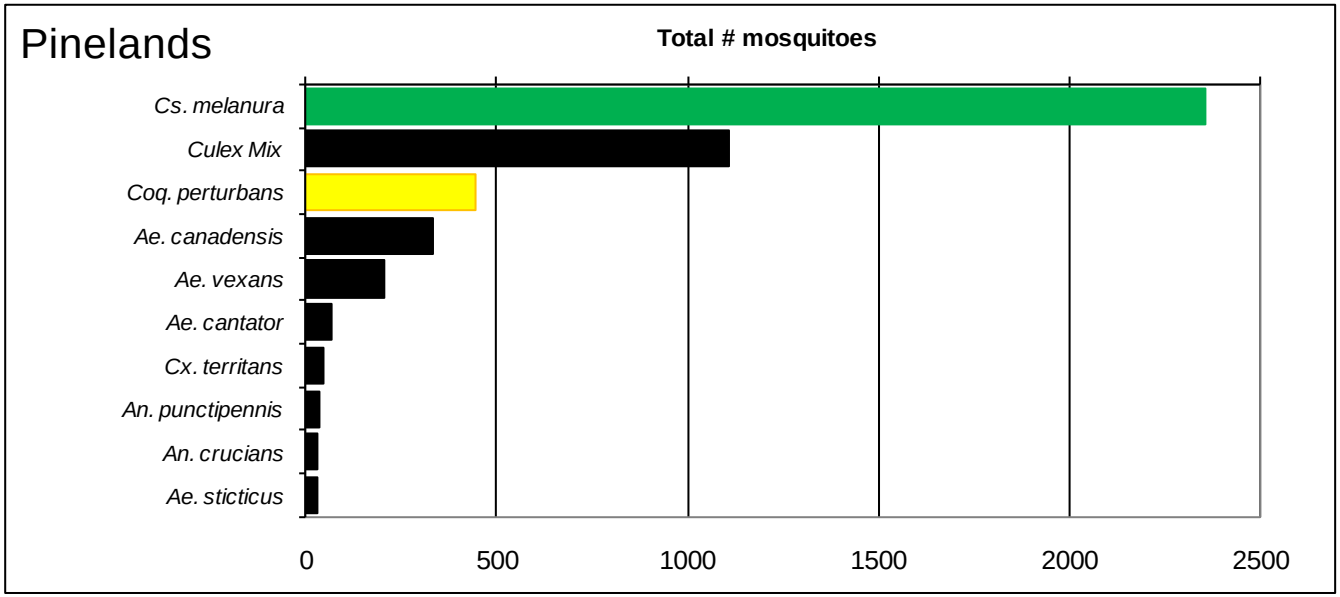

Delaware River Basin
Total # mosquitoes
Ae. vexans
Ae. cantator
Culex Mix
An. quadrimaculatus
Ae. canadensis
Ae. sticticus
An. walkeri
Ae. albopictus
Coq. perturbans
Ps. columbae
0
100
200
300
400
500
600
700
800
900
1000

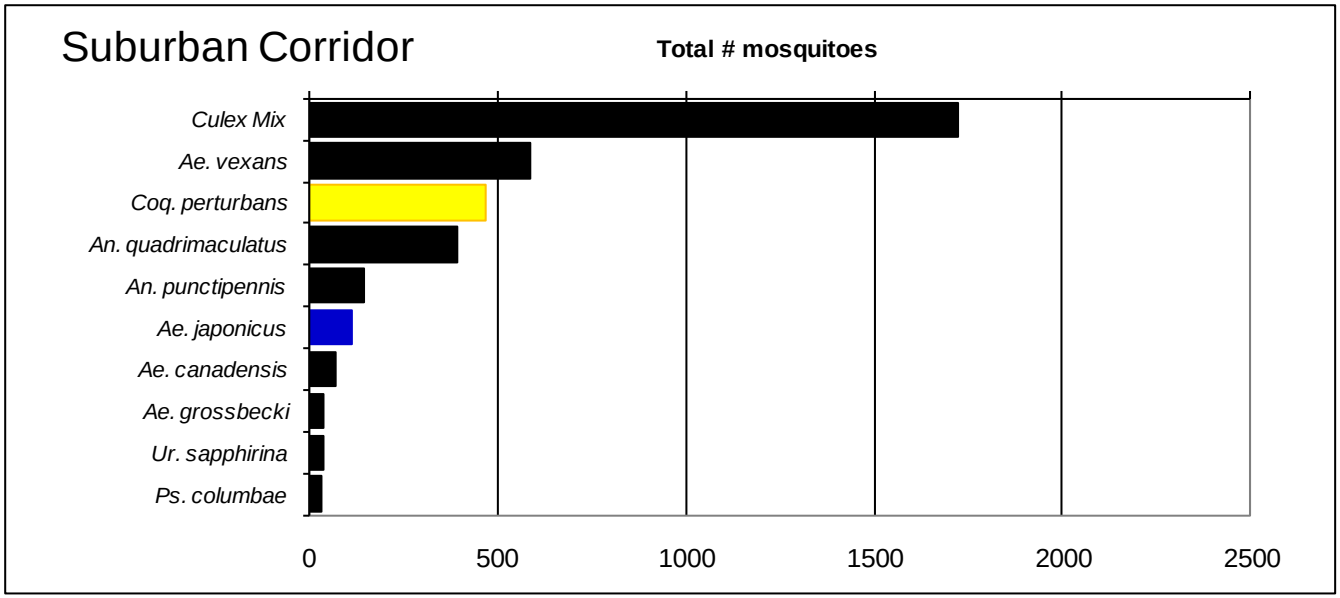

New York Metropolitan
Total # mosquitoes
Culex Mix
Ae. vexans
Ae. cantator
Coq. perturbans
Ae. sticticus
An. punctipennis
Ae. sollicitans
Ae. japonicus
Ae. stimulans
An. quadrimaculatus
0
500
1000
1500
2000
2500


North Central Rural
Total # mosquitoes
Culex Mix
Ae. vexans
Coq. perturbans
An. punctipennis
Ae. japonicus
Ae. canadensis
Ps. ciliata
Ps. columbae
An. quadrimaculatus
Ae. stimulans
0
100
200
300
400
500
600
700
800
900
1000


Northwest Rural
Total # mosquitoes
Coq. perturbans
An. quadrimaculatus
Ae. stimulans
Ae. vexans
Culex Mix
Ur. sapphirina
An. punctipennis
Ae. cinereus
Ae. cantator
An. walkeri
0
100
200
300
400
500
600
700
800
900
1000


Philadelphia Metropolitan
Total # mosquitoes
Culex Mix
Ae. vexans
Coq. perturbans
An. punctipennis
An. quadrimaculatus
Cs. melanura
Ae. sticticus
Ae. japonicus
An. crucians
Ur. sapphirina
0
100
200
300
400
500
600
700
800
900
1000


Pinelands
Total # mosquitoes
Cs. melanura
Culex Mix
Coq. perturbans
Ae. canadensis
Ae. vexans
Ae. cantator
Cx. territans
An. punctipennis
An. crucians
Ae. sticticus
0
500
1000
1500
2000
2500


Suburban Corridor
Total # mosquitoes
Culex Mix
Ae. vexans
Coq. perturbans
An. quadrimaculatus
An. punctipennis
Ae. japonicus
Ae. canadensis
Ae. grossbecki
Ur. sapphirina
Ps. columbae
0
500
1000
1500
2000
2500